

DTL9293422  
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DETAIL SPECIFICATION  
  
FOR THE  
  
CARTRIDGE, IGNITION, M299  
FOR 81 MM MORTAR

U.S. Army TACOM-ARDEC  
Picatinny Arsenal, NJ 07806-5000

Prepared by  
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This specification was approved as being in compliance with the criteria of MI-STD-961d by the TACOM - ARDEC QE&SA Detail Specification Review Panel on \_\_\_\_\_. Copies of the approval memorandum and signatures of authorized authorities are on the file and available upon request from the Preparing Activity.

FSC 1315

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This cover page must not be deleted from the solicitation copy.

## 1. SCOPE

1.1 Scope. This product description covers the requirements, examinations and tests for loading, assembling and packing of M299 Ignition Cartridges for the 81mm Mortar.

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are needed to meet the requirements specified in sections 3, 4, and 5 of this product description. This section does not include documents in other sections of this product description or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all requirements, documents cited in sections 3, 4, and 5 of this product description, whether or not they are listed.

### 2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards and handbooks of the exact revision below form a part of this document to the extent specified herein.

## STANDARDS

### DEPARTMENT OF DEFENSE

MIL-STD-1916 – Department of Defense Test Method Standard DOD Preferred methods for Acceptance of Product

(Unless otherwise indicated copies of this above specifications, standards and handbooks are available from the Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

### DRAWINGS (See 6.4)

U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING  
CENTER (ARDEC)

### PRODUCT AND PACKAGING DRAWINGS

9293422 - Cartridge, Ignition, M299

(Copies of other Government documents, drawings and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

## PUBLICATIONS

### CODE OF FEDERAL REGULATIONS

49 CFR - Interstate Commerce Commission Rules and Regulation for the Transportation of Explosives and other Dangerous Articles

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Orders for the above publication should cite 49 CFR (latest revision)).

2.2.3 Reference Documents. The following document is not mandatory but for reference only.

## SPECIFICATION

### DEPARTMENT OF DEFENSE

MIL-P-00223 – Powder, Black

2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents, which are DoD adopted, are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (See 6.2).

### AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS

B117 - Standard Test Method of Salt Spray (Fog) Testing

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, except references to higher level program unique specifications for this program, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained. (See contract provisions for additional precedence criteria).

## 3. REQUIREMENTS

3.1 Materials. Materials shall be in accordance with applicable drawings and specifications.

3.2 Assembly. The ignition cartridge assembly and components shall comply with all requirements specified on drawing 9293422 and with all requirements specified in applicable specifications, associated drawings and standards.

3.2.1 Corrosion resistance (salt spray). Parts selected for the salt spray test shall show no evidence of pitting or mottling when tested in accordance with 4.5.9.

3.3 Moisture content of black powder. The moisture content of the black powder used in loading the ignition cartridge, at the time of loading, shall not exceed 0.50 percent. Testing shall be as specified in 4.5.1.

3.4 Fed 150 primer testing.

3.4.1 Nonfunctioning. The primer shall not function under an applied energy value of 8.85 inch ounces minimum (min.) using a 2.95 pound ball when tested as specified in 4.5.2.1.

3.4.2 Sensitivity. The primer when tested as specified in 4.5.2.2 will be accepted if the following requirement is satisfied:

$$\frac{2.77 - \text{Mean}}{\sqrt{0.16 + SD^2}} \geq 3.35$$

Where

Mean = Mean Velocity calculated in 4.5.2.2.

SD = Standard Deviation calculated in 4.5.2.2.

3.4.3 Safety drop test. The primer shall not function as a result of the 1.5 meter (m) cartridge drop specified in 4.5.2.3.

3.5 Leak tests. Each loaded and cured ignition cartridge shall satisfactorily pass the leak tests specified in 4.5.3.

3.6 Velocity, functioning and security (proving ground test). The ignition cartridges shall comply with the following requirements (see 4.5.5)

3.6.1 Misfires. The ignition cartridges shall function on the first attempt, without any audible hang fire.

3.6.2 Velocity and functioning (proving ground). The cartridge assemblies shall function and shall impart a corrected muzzle velocity of not more than 225 feet per second (fps) and not less than 205 fps. In addition, the velocity standard deviation of the lot shall be not greater than 2.4 fps.

3.6.3 Metal part security. There shall be no evidence of rupture or metal parts separation in the gun bore or in flight.

3.7 Propellant charge uniformity. The M9 propellant lots shall achieve a velocity of 215 fps (see 4.5.6). This test shall be required when a lapse of two years or more occurs between propellant acceptance and LAP initiation.

3.8 Static pressure. The average internal ignition cartridge pressure plus 3 standard deviations shall not exceed 23,000 psi (see 4.5.7) when determined in accordance with MIL-P-60398B, (4.5.3).

3.9 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection in accordance with the technical provisions herein. (See 4.3 and 6.2)

3.10 Bursting strength. The tube assemblies shall not burst at a compression load of 57 pounds, minimum, but shall burst at a compression load of 192 pounds, maximum. Testing shall be as specified in 4.5.8.

3.11 Check test for deterioration of ignition cartridge. If the total elapsed time between original acceptance of the ignition cartridge lot and assembly of that lot into the complete round exceeds two years, or if the ignition cartridges shall be subjected to adverse conditions for any period of time since previous tests, the ignition cartridges shall be subjected to, and must satisfactorily comply with the test in 6.6 before the ignition cartridges are assembled into the complete rounds.

3.12 Workmanship. All parts and assemblies shall be fabricated and loaded in a thorough workmanlike manner. They shall be free of burrs, sharp edges, cracks, dirt, rust and other foreign matter. The cleaning method used shall not be injurious to any part nor shall parts be contaminated by the cleaning agent. All required markings should be neat and sharply defined.

#### 4. VERIFICATION

TABLE II: Requirements/verification cross reference matrix

METHOD OF VERIFICATION					CLASSES OF VERIFICATION			
1-Analysis 2-Demonstration 3-Examination 4-Test					A- First Article B- Conformance			
Section Requirement	Description	Verification Method				Verification Class		Section 4 Verification
		1	2	3	4	A	B	
3.1	Materials			X		X	X	4.4

3.2	Components & assemblies			X	X	X	X	4.5.2
3.2.1	Corrosion resistance (salt spray)	X			X	X	X	4.5.9
3.3	Moisture content of black powder	X			X	X	X	4.5.1
3.4	Fed 150 primer testing			X	X	X	X	4.5.2
3.4.1	Nonfunctioning			X	X	X	X	4.5.2.1
3.4.2	Sensitivity			X	X	X	X	4.5.2.2
3.4.3	Safety drop test			X	X	X	X	4.5.2.3
3.5	Leak tests			X	X	X	X	4.5.3
3.6	Velocity, functioning and security (proving ground test)			X	X	X	X	4.5.5
3.6.1	Misfire			X	X	X	X	4.5.5
3.6.2	Velocity and functioning (proving ground)			X	X	X	X	4.5.5
3.6.3	Metal part security			X	X	X	X	4.5.5
3.7	Propellant charge uniformity							4.5.6
3.8	Static pressure		X	X	X	X	X	4.5.7
3.9	First article		X	X	X	X		4.3
3.10	Bursting strength		X	X	X	X	X	4.5.8
3.11	Check test for deterioration of ignition cartridge			X	X		X	4.5.10/4.5.10.1
3.12	Workmanship			X	X	X	X	4.4.2.1-4.4.2.14

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3).
- b. Conformance inspection (see 4.4).

#### 4.3 First article inspection.

4.3.1 Submission. The contractor shall submit a first article sample as designated by the Contracting Officer for evaluation in accordance with the provisions of 4.3.2. The first article sample shall consist of the assemblies, components and test specimens in the quantities indicated in Table I.

4.3.2 Inspections to be performed. As determined by the government, the first article assemblies, components and test specimens may be subjected to any or all of the examinations and tests specified in this specification (see Table I) and be inspected for compliance with any or all requirements of this specification and the applicable drawings.





TABLE I. First Article Inspection  
**CLASSIFICATION OF CHARACTERISTICS**

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PARAGRAPH	TITLE	SHEET 1 of 3		DRAWING NUMBER See below
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
∞	<u>Pellet (Dwg. 7549177)</u> Examination for Defects	25	3.2	4.4.2.1
	Moisture Content	10	3.3	4.5.1
	<u>Plug, firing (Dwg. 9293426)</u> Examination for defects	25	3.2	4.4.2.10
	<u>Head (Dwg. 9293427)</u> Examination for defects	25	3.2	4.4.2.11
	<u>Tube (Dwg. 9285355)</u> Examination for defects	25	3.2	4.4.2.8
	Burst strength	25 1/	3.9	4.5.8
	<u>Body (Dwg. 9293428)</u> Examination for defects	25	3.2	4.4.2.9
	Salt spray test	25	3.2.1	4.5.9
	<u>Cap (Dwg. 9280537)</u> Examination for defects	25	3.2	4.4.2.13
	<u>Tube, flash (Dwg. 9293424)</u> Examination for defects	25	3.2	4.4.2.12
	Salt Spray Test	25	3.2.1	4.5.9

**NOTES:**

1/ The same samples submitted for examination shall be used for the burst test.

TABLE I. First Article Inspection  
**CLASSIFICATION OF CHARACTERISTICS**

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PARAGRAPH	TITLE	SHEET 2 of 3		DRAWING NUMBER See below
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
	<u>Flash Tube Assembly (Dwg. 9293423)</u> Examination for defects	25	3.2	4.4.2.1
	<u>Tube Assembly (Dwg. 9285390)</u> Examination for defects	25	3.2	4.4.2.2
	<u>Body Assembly (Dwg. 9293422)</u> Examination for defects	25	3.2	4.4.2.3
	<u>Cartridge, Ignition Prior to Filling with Propellant (Dwg. 9293422)</u> Examination for defects	25	3.2	4.4.2.5
	Sensitivity non-functioning	200	3.4.1	4.5.2.1
	Sensitivity functioning	500	3.6	4.5.2.2
	Safety Drop Test	25		4.5.2.3
	<u>Cartridge, Ignition, Prior to Assembly of Cap (Dwg. 9293422)</u> Examination of Defects	25	3.2	4.4.2.6
NOTES:				

TABLE I. First Article Inspection  
CLASSIFICATION OF CHARACTERISTICS

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PARAGRAPH	TITLE	SHEET 3 of 3		DRAWING NUMBER See below
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
	<u>Cartridge, Ignition, After Assembly of Cap (Dwg. 9293422)</u>			
	Examination for Defects	25	3.2	4.4.2.7
	Leak Test	50	3.5	4.5.3
	Static pressure test	25	3.8	4.5.7
	Proving Ground Test	50	3.6	4.5.5
NOTES:				

4.3.3 Rejection. If any assembly, component or test specimen fails to comply with any of the applicable requirements, the first article sample shall be rejected. The Government reserves the right to terminate inspection upon any failure of an assembly, component or test specimen to comply with any of the requirements. The first article ballistic test shall be rejected if:

- a. The mean velocity fails to comply with the requirement.
- b. The velocity standard deviation exceeds the requirement.
- c. One or more misfires attributable to the ignition cartridge occur.
- d. One or more metal part separations attributable to the ignition cartridge occur.

#### 4.4 Conformance inspection.

4.4.1 Inspection lot formation. The term "inspection lot" is defined as a homogeneous collection of units of product from which a representative sample is drawn or which is inspected 100 percent to determine conformance with applicable requirements. Units of product selected for inspection shall represent only the inspection lot from which they are drawn and shall not be construed to represent any prior or subsequent quantities presented for inspection. Homogeneity shall be considered to exist provided the inspection lot has been produced by one manufacturer, in one unchanged process, using the same materials and methods, in accordance with the same drawings, same drawing revisions, same specifications and same specification revisions. All material submitted for inspection in accordance with this specification shall comply with the homogeneity criteria specified herein, regardless of the type of inspection procedure, which is being applied to determine conformance with requirements. In addition, each inspection lot of ignition cartridges shall contain:

- a. Metal parts from one lot interfix from one manufacturer.
- b. Black powder pellets from one lot interfix from one manufacturer.
- c. M9 propellant from not more than one lot.
- d. Fed 150 primers from not more than one lot.

#### 4.4.2 Examinations and tests.

a. Classification of characteristics. Conformance examinations and tests are specified in the following Classification of Characteristics paragraphs. The contractor's quality program or detailed inspection system shall provide assurance of compliance of all characteristics with the applicable drawing and specification requirements utilizing as a minimum the conformance criteria specified.

b. The acceptance criteria for sampling inspection shall be in accordance with the levels provided in the conformance examination/test paragraph and MIL-STD-1916.

c. Alternative conformance acceptance. Unless otherwise specified herein or provided for in the contract, alternate conformance procedures may be proposed by the contractor (See paragraph 4.1) of MIL-STD-1916.

For the classification of characteristics, the following definitions apply:

Critical Level I - A critical level I defect is a defect that judgment and experience indicate would result in hazardous or unsafe conditions for individuals using, maintaining, or relying on the product, or a defect that judgment and experience indicate is likely to prevent performance of the tactical function of a major end item such as a tank, land vehicle, missile, aircraft, artillery, or other major weapon system

Critical Level II - A critical level II defect is a defect, other than critical level I, that judgment and experience indicate may, depending upon the degree of variance from the design requirement:

a. Result in hazardous or unsafe conditions for individuals using, maintaining, or relying upon the product; or

b. Prevent performance of the tactical function of a major end item.

Major - A major defect is a defect, other than critical, that is likely to result in failure, or that will materially reduce the usability of the product for its intended purpose.

Minor - A minor defect is a defect that is not likely to materially reduce the usability of the product for its intended purpose, or a defect that is a departure from established standards having little bearing on the effective use or operation of the unit.

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CLASSIFICATION OF CHARACTERISTICS

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PARAGRAPH 4.4.2.1	TITLE Pellet	SHEET 1 OF 1		DRAWING NUMBER 7549177
				NEXT HIGHER ASSEMBLY 9293422
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u>	None defined			
<u>Major</u>				
101	Weight of pellet	VL-IV	3.2	Balance
102	Moisture content	25 <u>1</u> /	3.3	4.5.1
103	Outside diameter	VL-IV	3.2	Gage
104	Inside diameter	VL-IV	3.2	Gage
105	Length	VL-IV	3.2	Gage
<u>Minor</u>				
201	Pellet chipped or cracked	VL-III	3.1	Visual
202	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES: <u>1</u> / Twenty-five (25) randomly selected pellets from each production shift.				

QUALITY CONFORMANCE INSPECTION  
CLASSIFICATION OF CHARACTERISTICS

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PARAGRAPH 4.4.2.2	TITLE Plug, Firing	SHEET 1 OF 1		DRAWING NUMBER 9293426
				NEXT HIGHER ASSEMBLY 9293422
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u>	None defined			
<u>Major</u>				
101	Length of tip	VL-IV	3.2	Gage
102	Total length including tip	VL-IV	3.2	Gage
103	Length from tip to small diameter	VL-IV	3.2	Gage
104	Radius improper	VL-IV	3.2	Gage
105	Large diameter	VL-IV	3.2	Gage
106	Small diameter	VL-IV	3.2	Gage
107	Protective finish missing	VL-IV	3.2	Visual
108	Chamfer missing or incorrect	VL-IV	3.2	Visual
109	True position of tip with large outside diameter	VL-IV	3.2	Gage
<u>Minor</u>				
201	Surface finish improper	VL-III	3.2	Visual
202	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES:				

QUALITY CONFORMANCE INSPECTION  
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PARAGRAPH 4.4.2.3	TITLE Head	SHEET 1 OF 2		DRAWING NUMBER 9293427
				NEXT HIGHER ASSEMBLY 9293422
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u>	None defined			
<u>Major</u>				
101	Pitch diameter of internal threads	VL-IV	3.2	Gage
102	Minor diameter of internal threads	VL-IV	3.2	Gage
103	Pitch diameter of external threads	VL-IV	3.2	Gage
104	Major diameter of external threads	VL-IV	3.2	Gage
105	Length of internal thread, min.	VL-IV	3.2	Gage
106	Overall length	VL-IV	3.2	Gage
107	Length of large internal diameter	VL-IV	3.2	Gage
108	Diameter of firing plug hole	VL-IV	3.2	Gage
109	Large outside diameter	VL-IV	3.2	Gage
110	Small outside diameter	VL-IV	3.2	Gage
111	Large inside diameter	VL-IV	3.2	Gage
112	True position of large inside diameter with P.D. of external thread	VL-IV	3.2	Gage
113	True position of firing plug hole with P.D. of external thread	VL-IV	3.2	Gage
114	True position of internal threads with external threads	VL-IV	3.2	Gage
115	Length from shoulder to end of external threads	VL-IV	3.2	Gage
116	Protective finish missing	VL-IV	3.2	Visual
NOTES:				



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PARAGRAPH 4.4.2.3	TITLE Head (cont'd)	SHEET 2 OF 2		DRAWING NUMBER 9293427
				NEXT HIGHER ASSEMBLY 9293422
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Minor</u>				
201	Surface finish improper	VL-III	3.2	Visual
202	Diameter of spanner holes	VL-III	3.2	Gage
203	Depth of spanner holes	VL-III	3.2	Gage
204	Location of spanner holes	VL-III	3.2	Gage
205	Distance from front face to shoulder	VL-III	3.2	Gage
206	Length of thread undercut	VL-III	3.2	Gage
207	Chamfer missing or incorrect	VL-III	3.2	Visual
208	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES:				

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PARAGRAPH 4.4.2.4	TITLE Paper Tube	SHEET 1 OF 1		DRAWING NUMBER 9285355
				NEXT HIGHER ASSEMBLY 9285390
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u>	None defined			
<u>Major</u>				
101	Thickness	VL-IV	3.2	Gage
102	Length	VL-IV	3.2	Gage
103	Inside diameter	VL-IV	3.2	Gage
104	Tube not spiral wound	5	3.2	Visual
105	Burst strength	25	3.9	Gage/4.5.8
<u>Minor</u>				
201	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES:				

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PARAGRAPH 4.4.2.5	TITLE Body	SHEET 1 OF 2		DRAWING NUMBER 9293428
				NEXT HIGHER ASSEMBLY 9293422
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical I</u>	None defined			
<u>Critical II</u> 1	Flash hole missing or obstructed	100%	3.2	Visual
<u>Major</u> 101	Pitch diameter of threads, min.	VL-IV	3.2	Gage
102	Major diameter of threads, min.	VL-IV	3.2	Gage
103	Diameter of primer cavity	VL-IV	3.2	Gage
104	Depth of primer cavity	VL-IV	3.2	Gage
105	Depth of flash tube cavity	VL-IV	3.2	Gage
106	Diameter of flash tube cavity	VL-IV	3.2	Gage
107	Diameter of flash hole rear of pellet cavity	VL-IV	3.2	Gage
108	Large outside diameter	VL-IV	3.2	Gage
109	Diameter of pellet cavity	VL-IV	3.2	Gage
110	Depth to bottom of pellet cavity	VL-IV	3.2	Gage
111	Length overall	VL-IV	3.2	Gage
112	True position of primer cavity	VL-IV	3.2	Gage
113	Width of groove	VL-IV	3.2	Gage
114	Depth of groove	VL-IV	3.2	Gage
115	Small outside diameter	VL-IV	3.2	Gage
NOTES:				

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PARAGRAPH 4.4.2.5	TITLE Body (cont'd)	SHEET 2 OF 2		DRAWING NUMBER 9293428
				NEXT HIGHER ASSEMBLY 9293422
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
116	Diameter of countersink at base of primer cavity, max.	VL-IV	3.2	Gage
117	Length from rear face to large outside diameter	VL-IV	3.2	Gage
118	Outside diameter forward and rear of groove	VL-IV	3.2	Gage
119	Length from large diameter to end of external thread	VL-IV	3.2	Gage
120	Length from large diameter to beginning of thread	VL-IV	3.2	Gage
121	Diameter of thread undercut	VL-IV	3.2	Gage
122	Length of large diameter section	VL-IV	3.2	Gage
123	Length from front face to groove	VL-IV	3.2	Gage
124	Protective finish missing	VL-IV	3.2	Visual
125	True position of forward outside diameter with P.D. of thread	VL-IV	3.2	Gage
126	Salt spray test	VL-IV	3.2.1	Visual/4.5.9
127	Inside chamfer at entrance of primer cavity incorrect	25	3.2	Gage
<u>Minor</u>				
201	Radii or chamfers missing or incorrect	VL-III	3.2	Visual
202	Surface finish improper	VL-III	3.2	Visual
203	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES:				

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PARAGRAPH 4.4.2.6	TITLE Cap	SHEET 1 OF 1		DRAWING NUMBER 9280537
				NEXT HIGHER ASSEMBLY 9293422
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
Critical	None defined			
Major				
101	Forward outside diameter (OD)	VL-IV	3.2	Gage
102	Total length	VL-IV	3.2	Gage
103	Rear OD	VL-IV	3.2	Gage
104	Distance from rear face to shoulder	VL-IV	3.2	Gage
105	Diameter of cavity	VL-IV	3.2	Gage
106	Depth of cavity	VL-IV	3.2	Gage
107	True position of cavity with rear OD	VL-IV	3.2	Gage
108	Protective finish missing or inadequate	VL-IV	3.2	Visual
109	True position of forward OD with rear OD	VL-IV	3.2	Gage
110	Radius at bottom of cavity over maximum	VL-IV	3.2	Gage
Minor				
201	Radii or chamfers missing or improper	VL-III	3.2	Visual
202	Surface finish improper	VL-III	3.2	Visual
203	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES:				

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PARAGRAPH 4.4.2.7	TITLE Tube, Flash	SHEET 1 OF 1		DRAWING NUMBER 9293424
				NEXT HIGHER ASSEMBLY 9294757
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical I</u>	None defined			
<u>Critical II</u>				
1	Longitudinal flash hole missing or obstructed	100%	3.2	Visual
2	Flash hole(s) missing or excessive in number or obstructed	100%	3.2	Visual
<u>Major</u>				
101	True position of flash holes to forward outside diameter and rear face	VL-IV	3.2	Gage
102	Diameter of flash holes	VL-IV	3.2	Gage
103	Overall length	VL-IV	3.2	Gage
104	Large outside diameter	VL-IV	3.2	Gage
105	Small outside diameter	VL-IV	3.2	Gage
106	Length of small outside diameter	VL-IV	3.2	Gage
107	Large inside diameter	VL-IV	3.2	Gage
108	Length of large inside diameter	VL-IV	3.2	Gage
109	Protective finish missing or inadequate	VL-IV	3.2	Visual
110	Small inside diameter	VL-IV	3.2	Gage
111	Salt spray test	25	3.2.1	Visual/4.5.9
<u>Minor</u>				
201	Surface finish improper	VL-III	3.2	Visual
202	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES:				

QUALITY CONFORMANCE INSPECTION  
CLASSIFICATION OF CHARACTERISTICS

DTL9293422

PARAGRAPH 4.4.2.8	TITLE Flash Tube Assembly	SHEET 1 OF 1		DRAWING NUMBER 9293423
				NEXT HIGHER ASSEMBLY 9293422
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical II</u> 1	Heat shrinkable tubing missing, loose, or does not completely cover all flash holes	100%	3.2	Visual/Manual
<u>Major</u> 101	Pin missing	100%	3.2	Visual
102	Length, max.	VL-IV	3.2	Gage
<u>Minor</u> 201	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES:				

QUALITY CONFORMANCE INSPECTION  
CLASSIFICATION OF CHARACTERISTICS

DTL9293422

PARAGRAPH 4.4.2.9	TITLE Tube Assembly	SHEET 1 OF 1		DRAWING NUMBER 9285390
				NEXT HIGHER ASSEMBLY 9293422
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u>	None defined			
<u>Major</u>				
101	Outside diameter, max.	VL-IV	3.2	Gage
102	Inside diameter, min	VL-IV	3.2	Gage
103	Length of tube fold-in, max	VL-IV	3.2	Gage
104	Complete coverage by tube without wrinkle or separation	VL-IV	3.2	Gage
105	Tubing missing, loose, wrinkled, separating or inadequately covering external surface	VL-IV	3.2	Visual/Manual
<u>Minor</u>				
201	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES:				



QUALITY CONFORMANCE INSPECTION  
CLASSIFICATION OF CHARACTERISTICS

DTL9293422

PARAGRAPH 4.4.2.10	TITLE Cartridge, Ignition, M299 Loading Assembly	SHEET 1 OF 1		DRAWING NUMBER 9293422
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical</u>	None defined			
<u>Major</u>				
101	Primer missing or inverted	100%	3.2	Visual
102	Primer above flush, 0.024 max	100% 1/	3.2	Gage
103	Lacquer seal missing or inadequate	VL-IV 1/	3.2	Visual/4.5.3.1
104	Presence of any adhesive or sealant on face of primer	VL-IV	3.2	Visual
<u>Minor</u>				
201	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES: 1/ This is an in-process inspection to check if the primer is seated above flush (0.024 in., max) and for lacquer seal missing or inadequate before proceeding to next production flow station.				

QUALITY CONFORMANCE INSPECTION  
CLASSIFICATION OF CHARACTERISTICS

DTL9293422

PARAGRAPH 4.4.2.11	TITLE Cartridge, Ignition Prior to Filling with Propellant	SHEET 1 OF 1		DRAWING NUMBER 9293422
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical I</u>				
1	Sensitivity non-functioning	<u>1</u> /	3.4.1	4.5.2.1
2	Safety drop test	25 <u>2</u> /	3.4.3	4.5.2.3
<u>Critical II</u>				
1	Firing plug not loose after assembly	100%	3.2	Visual/Manual
2	Firing plug above flush with head surface	100%	3.2	Gage
<u>Major</u>				
101	Body not fully assembled to head	VL-IV	3.2	Visual
102	Body and head improperly staked (2 places)	VL-IV	3.2	Visual
103	Pellet missing or broken	100% <u>3</u> /	3.2	Visual
104	Presence of adhesive for 360 degrees in body groove prior to assembling to tube assembly	VL-IV	3.2	Visual
105	Tube assembly improperly seated on body	VL-IV	3.2	Visual
106	Sensitivity functioning	<u>4</u> /	3.4.2	Visual
107	Flash tube assembly missing	100%	3.2	Visual
<u>Minor</u>				
201	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES: <u>1</u> / See sampling plans contained in paragraph 4.4.3.3.1. <u>2</u> / Safety drop test shall be conducted on per primer lot basis. <u>3</u> / Minor chipping of edges acceptable, no chunks or excessive chipping. <u>4</u> / See sampling plans contained in paragraph 4.4.3.3.2.				

QUALITY CONFORMANCE INSPECTION  
CLASSIFICATION OF CHARACTERISTICS

DTL9293422

PARAGRAPH 4.4.2.12	TITLE Cartridge, Ignition, Prior to Assembly of Cap	SHEET 1 OF 1		DRAWING NUMBER 9293422
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical I</u>				
1	Flash tube assembly missing	100%	3.2	Gage
2	Propellant weight (after loading)	100% <u>1/</u>	3.2	4.4.3.1/4.5.4.1/Gage
<u>Critical II</u>				
1	Propellant weight greater than 10 grains below lower limit or above upper limit (after loading)	100% <u>1/</u>	3.2	4.4.3.1/4.5.4.1/Gage
<u>Major</u>				
101	Propellant weight greater than 1 grain to less than 10 grains	100% <u>1/</u>	3.2	4.4.3.1/4.5.4.1/Gage
102	Environmental conditions inadequate	<u>2/</u>	3.2	Gage
<u>Minor</u>				
201	Foreign matter in charge	VL-III	3.2	Visual
202	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES: <u>1/</u> Same sample used for both inspections. See 4.4.3.2 for defect description. <u>2/</u> Temperature and humidity shall be checked at the beginning and end of each shift. If conditions are not proper at either time, the quantity of product represented by the conditioning shall be rejected.				

QUALITY CONFORMANCE INSPECTION  
CLASSIFICATION OF CHARACTERISTICS

DTL9293422

PARAGRAPH 4.4.2.13	TITLE Cartridge, Ignition, After Assembly of Cap	SHEET 1 OF 1		DRAWING NUMBER 9293422
				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE
<u>Critical I</u>	None Defined			
<u>Critical II</u>				
1	Propellant weight greater than 10 grains below lower limit or above upper limit	315 <u>1</u> /	3.2	4.4.3.2/4.5.4.2/Gage
2	Static Pressure test	25 <u>3</u> /	3.8	4.5.7
<u>Major</u>				
101	Channel not completely filled with RTV sealant	VL-IV	3.2	Visual
102	Cap cocked or not completely seated	VL-IV	3.2	Visual
103	Distance from shoulder to front of cap, max	VL-IV	3.2	Gage
104	True position of outside diameter with major diameter of head thread	VL-IV	3.2	Gage
105	Propellant weight	315 <u>1</u> /	3.2	4.4.3.2/4.5.4.2/Gage
106	Leak test	100%	3.5	4.5.4.2
107	Velocity, functioning and security (proving ground)	<u>2</u> /	3.6	4.5.5
108	Environmental conditions inadequate	<u>4</u> /	3.2	Gage
109	Presence of excessive sealant	VL-IV	3.2	Visual
<u>Minor</u>				
201	Marking missing, misleading or unidentifiable	VL-III	3.2	Visual
202	Evidence of poor workmanship	VL-III	3.12	Visual
NOTES: <u>1</u> / This inspection shall be conducted just prior to pack out. See sample used for both inspections (see 4.4.3.2 for defect description). <u>2</u> / See paragraph 4.4.3.4 for sampling plans. <u>3</u> / <b>Static pressure test should be conducted on per lot and per charge weight basis of propellant lot.</b> <u>4</u> / Temperature and humidity shall be checked at the beginning and end of each shift. If conditions are not proper at either time, the quantity of product represented by the conditioning shall be rejected.				

QUALITY CONFORMANCE INSPECTION  
CLASSIFICATION OF CHARACTERISTICS

DTL 9293422

PARAGRAPH 4.4.2.14	TITLE Primer, Fed 150	SHEET 1 OF 1		DRAWING NUMBER 12977240	
		NEXT HIGHER ASSEMBLY 9280553			
CLASSIFICATION	EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD REFERENCE	
<u>Critical</u>  <u>Major</u> 101  <u>Minor</u> 201	None defined  Height  Evidence of poor workmanship	100%  Level V	3.3  3.11	Gage  Visual	
NOTES:					

#### 4.4.3 Testing.

4.4.3.1 Prior to assembly of cap (see Dwg. 9293422). The propellant charge shall be volumetrically dispensed (or tare-weighed) in a container, transferred to the ignition cartridge and then check-weighed 100 percent. The check weighing shall be specified in paragraph 4.5.4.1. The volumetric dispensing (or initial weighing) and check weighing shall be performed by different operators on different scales. Weight limits for weighing shall be established within the applicable requirements, depending upon the accuracy and precision of the weighing system to assure compliance with the charge weight requirements. Any charge of bulk propellant failing to meet the applicable requirements shall be classed defective and remove from the lot.

4.4.3.2 After assembly of cap (see Dwg. 9293422). Critical defect: More than 10 grains above assessed maximum weight. Critical defect: More than 10 grains below assessed minimum weight. Major defect: 1 to 10 grains above assessed maximum weight. Major defect: 1 to 10 grains below assessed minimum weight. 315 sample ignition cartridge assemblies shall be randomly selected from each lot for this test. If any sample exceeds the assessed maximum weight by more than 10 grains or if two or more samples exceed the assessed maximum weight by 1 to 10 grains, the lot shall be rejected. If any sample is under the assessed minimum weight by more than 10 grains or if two or more samples are under the assessed minimum weight by 1 to 10 grains, the lot shall be rejected. Testing shall be as specified in paragraph 4.5.4.2.

#### 4.4.3.3 Sensitivity

##### 4.4.3.3.1 Nonfunctioning.

a. Beginning with the first lot produced and continuing until three consecutive lots have complied with the acceptance criteria specified, 200 primed head assemblies (consisting of the firing plug Dwg. 9293426, head Dwg. 9293427 and body with primer Dwg. 9293428) shall be randomly selected from each lot for this test. If one or more cartridges fail to comply with the specified requirement, the lot shall be rejected. The test shall be performed as specified in 4.5.2.1.

b. After three consecutive lots have met the criteria of 4.4.3.3.1.a, 125 samples shall be tested using the same acceptance criteria. If a lot is rejected, revert to sampling plan per 4.4.3.3.1.a. The test shall be performed as specified in 4.5.2.1.

4.4.3.3.2 Sensitivity. A random sample of five hundred (500) primed head assemblies (consisting of the firing plug Dwg. 9293426, head Dwg. 9293427 and body assembly Dwg. 9293428) shall be selected from each lot for this test. The test shall be performed as specified in 4.5.2.2 using the Government's design test equipment or an approved alternate (See 4.4.4).

4.4.3.3.3 Safety drop test. Twenty-five (25) ignition cartridge assemblies (without the M9 propellant) in accordance with Dwg. 9293422 shall be selected for this test. If one or more of the test samples function when tested as specified in 4.5.2.3, the primer lot shall be rejected. This test shall be performed only upon initial use of each primer lot.

#### 4.4.3.4 Ballistic sampling.

4.4.3.4.1 Ballistic characteristics. The following defect classifications apply to the ballistic test:

- a. Misfires, Major defect (3.6.1)
- b. Metal part separation, critical II defect (3.6.3)
- c. Mean velocity and standard deviation, Major defect (3.6.2).

4.4.3.4.2 Initial production. Beginning with the first lot produced and continuing until three consecutive lots have complied with the applicable requirements, a sample of 50 ignition cartridges shall be selected and tested as specified in 4.5.5. The lot shall be rejected if:

- a. The mean velocity fails to meet the requirement.
- b. The velocity standard deviation exceeds the requirement.
- c. One or more misfires attributable to the ignition cartridge occur.
- d. One or more metal part separations occur.

4.4.3.4.3 Subsequent production. After three consecutive lots have met the criteria of 4.4.3.4.2, sample of 35 ignition cartridges shall be selected and tested as specified in 4.5.5. If a lot is rejected, revert to sampling plan per 4.4.3.4.2. This test shall be performed as specified in 4.5.5. The lot shall be rejected if:

- a. The mean velocity fails to meet the requirement.
- b. The velocity standard deviation exceeds the requirement.
- c. One or more misfires attributable to the ignition cartridge occur.
- d. One or more metal part separations occur.

4.4.4 Inspection equipment. The inspection equipment required to perform the inspections specified herein is identified in the “Inspection Method Reference” column of the Classification of Characteristics listings starting with 4.4.2.1. Contractor inspection equipment designs shall be submitted for Government approval as specified in the contract. Designs which provide variable measurements instead of attributes data are preferred in order to facilitate the use of statistical process control. See 6.3 herein.

#### 4.5 Methods of inspection.

4.5.1 Moisture content of black powder. The procedures used for determining the moisture content of the black powder pellets shall be equivalent to that specified in MIL-P-223. A sample of no less than 25 black powder pellets shall be randomly selected from each production shift. If any sample fails to comply with the requirement cited in paragraph 3.3 herein, all pellets in the production shift represented by this sample shall be rejected. If loading with propellant has begun, ignition cartridges loaded with the non-conforming black powder pellets shall be rejected.

#### 4.5.2 Primer testing.

4.5.2.1 Nonfunctioning. The head loading assembly shall be assembled to a suitable fixture. The firing pin of the test fixture shall be adjusted so that impact will be on the center of the firing plug of the assembly. A steel ball shall be dropped onto the firing pin producing 8.85 inch ounces of energy (min.). The height of drop shall be measured as the height from the top of the firing pin to the bottom of the weight. Any head loading assembly that functions shall be classed defective. Samples used in this test shall not be returned to the lot.

4.5.2.2 Sensitivity. The head loading assemblies shall be divided into ten (10) groups of fifty (50) each. When assembled in the Drop Test Fixture (12977160). A 7.8 pound steel weight shall be dropped on to the firing pin starting from a height of 0.1 inches. The height of the drop shall be increased by 0.05 inches after each group of fifty primers is tested until the all fire height is reached. The "fire" and "no fire" events shall be recorded for each group. The mean drop velocity and standard deviation shall be calculated and recorded (see 6.8). And should the mean and standard deviation not meet the requirements of paragraph 3.4.2 or if an all fire height is not reached after all 500 primer housing assemblies have been tested, the lot shall be rejected.

4.5.2.3 Safety drop test. The test assemblies shall be assembled into inert-loaded, standard 81mm cartridges (Weighed to  $8.9 \pm 0.02$  lbs. for M821A1/A2). Each cartridge shall be dropped twice from a height of 1.5m on a steel top surface. For the first drop, the cartridge shall be in the base (fin) down orientation. For the second drop, the cartridge shall be in the nose (fuze) down orientation. The drop height shall be measured from the lowest point of the cartridge orientation to the top of the anvil surface. Any test assembly which functions as a result of the drop shall be classed defective. All questionable test assemblies shall be downloaded to verify primer functioning or nonfunctioning. All components used for this test shall not be returned to their respective lots.

#### 4.5.3 Leak tests.

4.5.3.1 Ignition cartridge. The ignition cartridges shall be subjected to a pressure of  $3 \pm 1$  psig for duration of five (5) seconds minimum. Any ignition cartridge with a leak rate of 1.5 CC per minute or greater shall be rejected and remove from the lot. The test equipment shall be calibrated at the start of each day's operation and prior to production restarts. A restart results from any break in continuous production whether it is due to equipment stoppage/failure or operator breaks. Both accept and reject standards shall be used for each calibrated occasion. If



the equipment is out of calibration, the ignition cartridges tested since the last successful calibration shall be retested after correction of the equipment. Equipment design shall be submitted for approval (see 4.4.4).

#### 4.5.4 Weight of propellant.

4.5.4.1 Prior to assembly of cap. The ignition cartridge subassembly shall be weighed before and after the propellant is loaded. The weight of the propellant charge shall be determined by subtracting the tare weight of the ignition cartridge subassembly from the gross weight (after loading). The contractor may elect to perform the 100 percent check-weighing operation with automated equipment and mandatory process controls. In such cases, process control plans in accordance with data item description DI-P1604 must be submitted to the technical agency for approval of the automated operations.

4.5.4.2 After assembly of cap. The propellant shall be removed from each ignition cartridge sample, placed on the pan of a precision or analytic balance and weighed. Alternatively, the ignition cartridge assembly may be weighed and reweighed after removal of the propellant: The weight of the propellant charge shall be determined by subtracting the weight of the empty ignition cartridge from the loaded (gross) weight. The weight of the propellant in each sample shall be determined to the nearest 0.01 grain.

4.5.5 Velocity, functioning and security (proving ground test). The test shall be performed at a Government Proving Ground in accordance with the applicable USA TECOM Acceptance Test Procedure.

The sample ignition cartridges shall be assembled to 81mm cartridges, (Weighed to  $8.9 \pm 0.02$  lbs. for M821A1/A2/M879) for which they were manufactured. The complete assembly, less propelling charges, shall be fired from an M252 81mm mortar at an elevation of forty-five degrees.

Calibration rounds shall be fired without propelling charges for the purpose of velocity correction. At least one reference round should be fired for every three test rounds.

Individual velocities and individual chamber pressure shall be recorded on the firing record for both calibration and test rounds. Velocity and Pressure standard deviations and arithmetic averages shall be calculated and recorded. Temperature of the day and time of firing shall also be recorded. In the event of a misfire, the misfired ignition cartridge shall not be disassembled by the proving ground but shall be forwarded to the responsible technical activity.

4.5.5.1 Refiring. If for any reason the proving ground considers that conditions have detrimentally affected the test results, additional cartridges as required shall be tested.

4.5.6 Propellant charge uniformity. (To be conducted at a U.S. Government Proving Ground). Ten test ignition cartridges shall be loaded at charge weight with a tolerance of plus or minus 0.5 grains. The ignition cartridges shall be assembled to 81mm production rounds. Rounds shall be inert loaded to achieve a total weight as specified in Table II. The rounds shall

be conditioned at 70°F ( $\pm 2.5^\circ\text{F}$ ) for 24 hours prior to firing and shall be maintained at this temperature until fired. The rounds shall be fired from a M252 81mm mortar at an elevation of forty-five degrees. Calibration rounds shall be fired alternately for velocity correction.

Table II: Cartridge Weight

Cartridge	Cartridge Weight	Velocity (max) (Para 3.6.2)	Velocity (min) (Para 3.6.2)	Uniformity Velocity (Para 3.7)
M821A1/A2	8.9 +0.02 lbs	200 fps	180 fps	190 fps
M879	8.9 +0.02 lbs	220 fps	200 fps	210 fps

The corrected velocities of the group shall be compared to the established charge velocity. If the corrected velocity of the test rounds exceeds  $\pm$  two percent of the expected muzzle velocity, use of the propellant lot shall be referred. Test results shall be forwarded to the technical agency for evaluation (see 6.5).

4.5.7 Static pressure test. The static pressure test will be performed similar to 60 MM design provided herewith. The ignition cartridges shall be threaded into the M24 Fin and firmly seated. A 3/32-inch hole shall be drilled in the ignition cartridge tube through one flash hole in the sixth row of flash holes in the fin boom, counting from the ignition cartridge end. A pressure transducer, mounted to a collar (see Figure 2), shall be attached to the fin boom, positioning the collar so that the transducer will be directly over the flash hole drilled in the ignition cartridge tube. The collar shall be positioned carefully to prevent restriction of venting from other flash holes in the boom. The assembly shall be set up as shown in Figure 1 and the transducer connected to a recorder. The ignition cartridge shall then be functioned and pressure/time tracer recorded.

STATIC IGNITION CARTRIDGE TEST SETUP

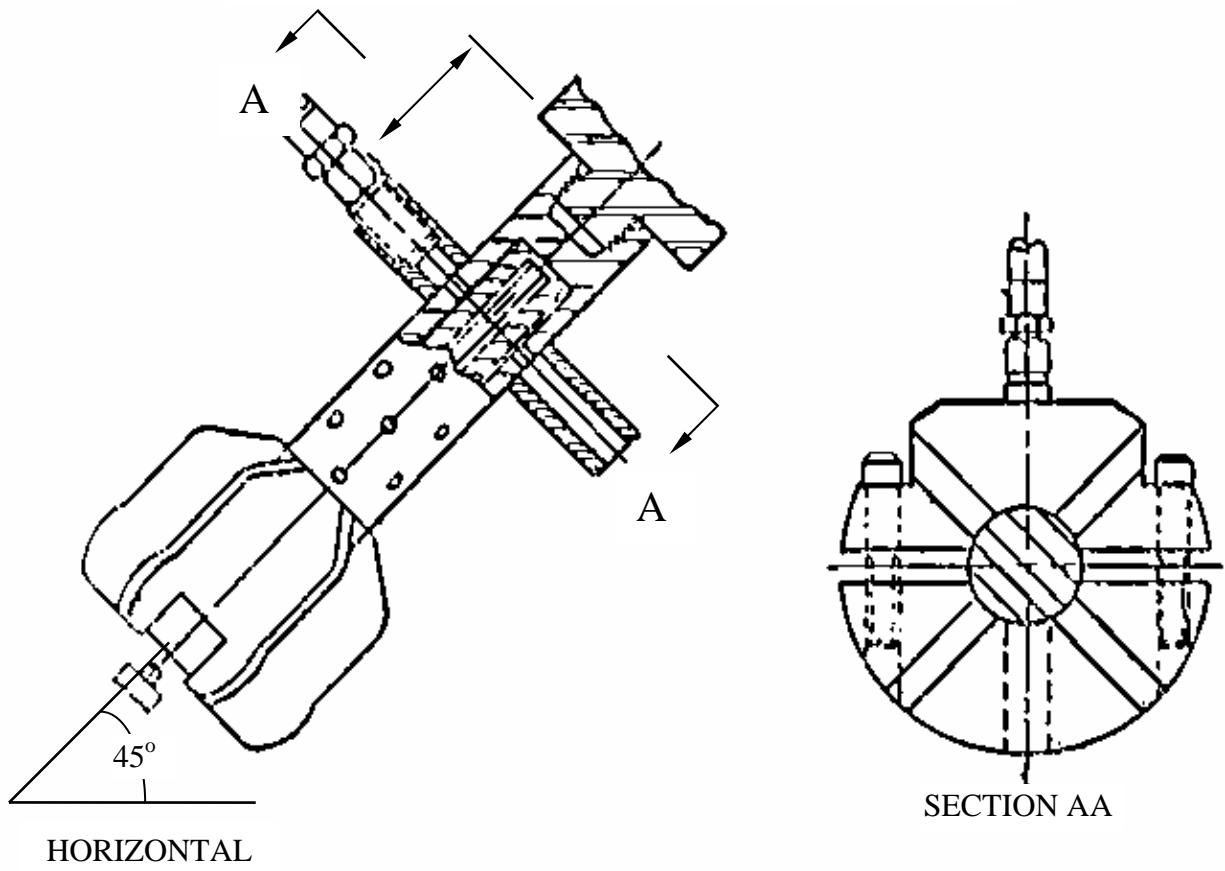


Figure 1

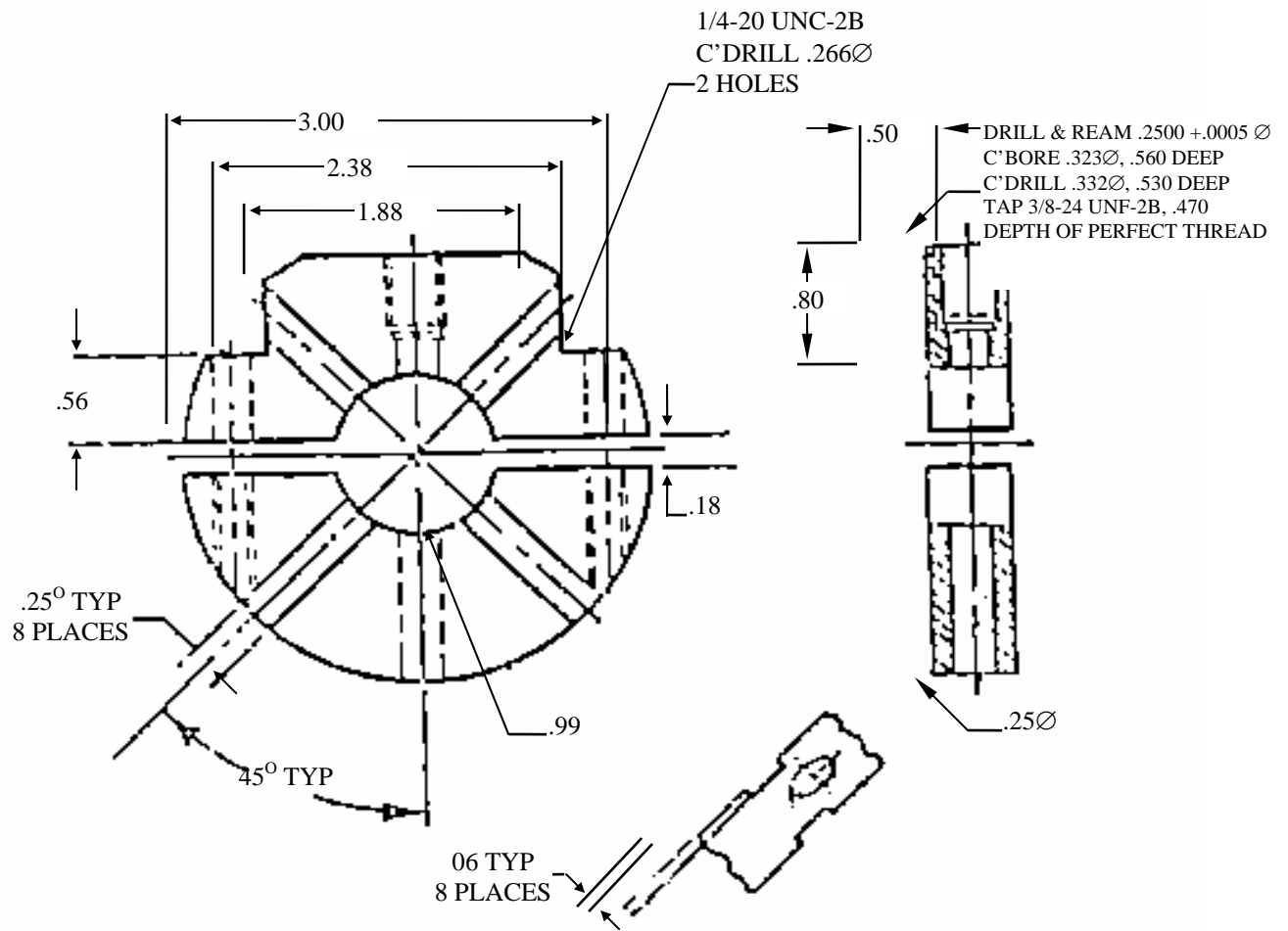


Figure 2

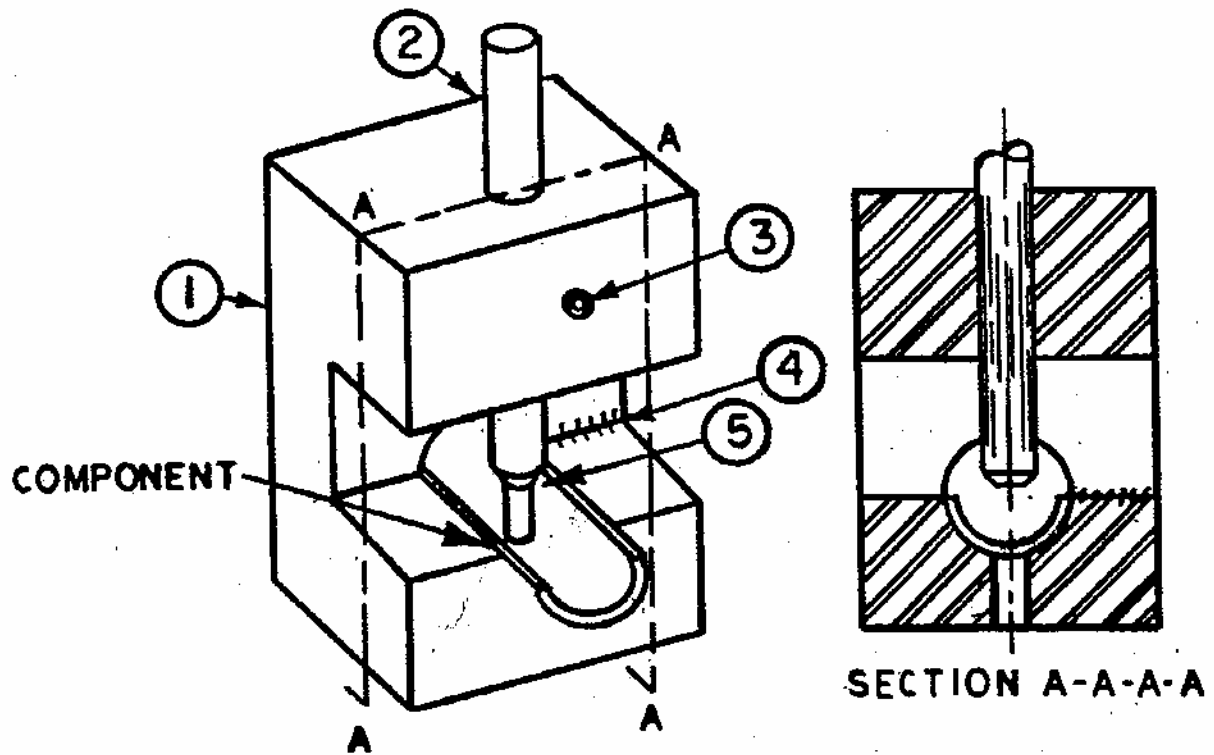
4.5.8 Bursting strength. The tube shall be cut in half lengthwise and one of the halves placed in the fixture (see Figure 1). The stop (3) shall be completely removed or backed off so that it does not touch the punch (2). Place fixture in universal tester set for a travel speed of 0.125 inches per minute. Proceed with Test Number 1 and 2.

TEST NUMBER 1: NO BURST

Apply 57-pound compression load, remove body assembly. Item is rejected if evidence of bursting is observed. Tearing or puncturing of material shall be considered evidence of bursting.

TEST NUMBER 2: BURSTING

If item is not rejected, replace it in fixture, using opposite end of body and apply 192 pounds compression load. If item shows no evidence of bursting (punch travels through material) it shall be rejected.



# ASSEMBLY BUSTING STRENGTH TEST FIXTURE

Figure 3 – Sheet 1

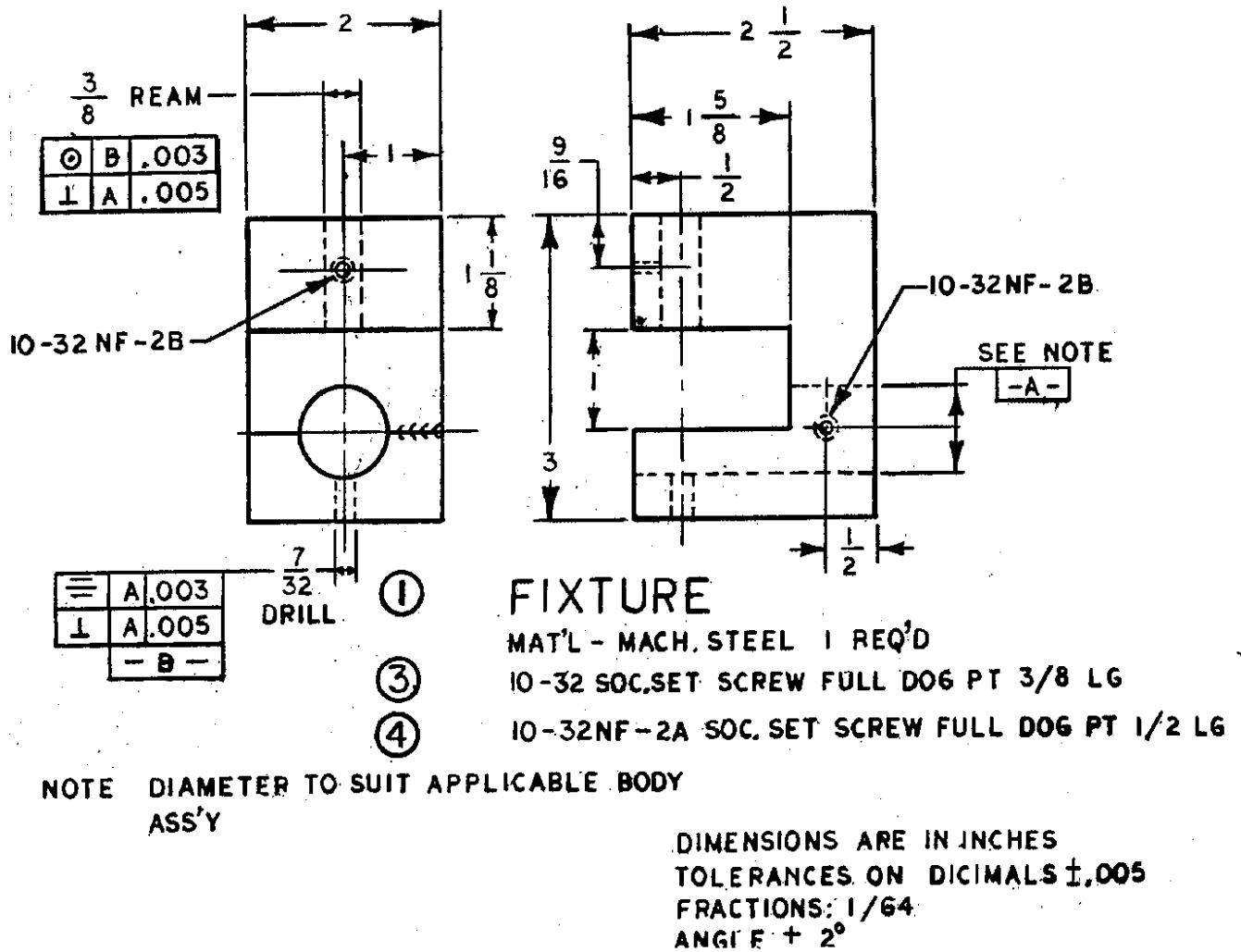


Figure 3 – Sheet 2

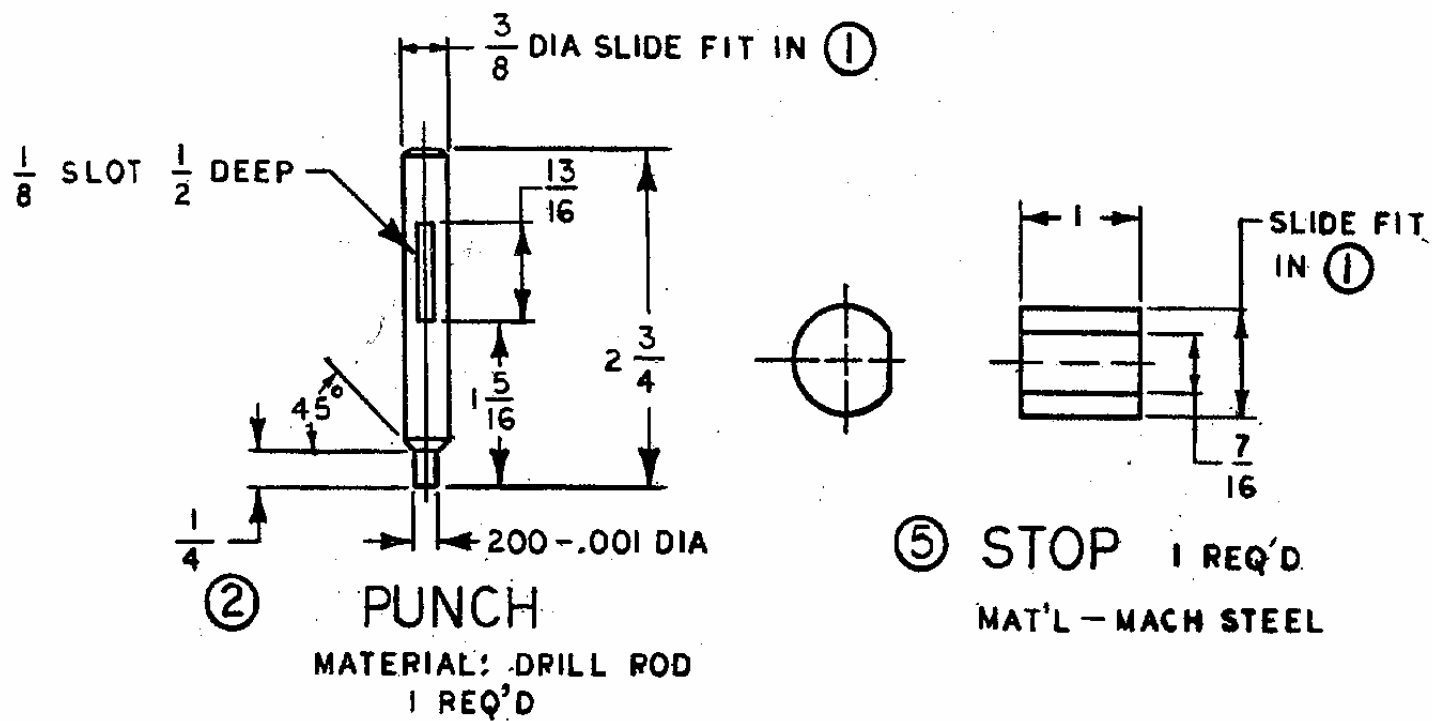


Figure 3 - Sheet 3



4.5.9 Salt spray testing. Samples selected for this test shall be tested using equipment and procedures in accordance with ASTM B117. Test duration shall be specified on the drawing. Parts shall be rinsed, dried and examined for evidence of pitting or mottling of the finish. One or more pits or mottling shall be cause for rejection of all parts represented by the sample.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's system Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of general or explanatory nature and may be helpful, but not mandatory.)

6.1 Intended use. The components covered by this product description are intended for assembly to M879, M821A1/A2 cartridges for use with the 81mm Mortar system.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of this specification.
- b. Issues of DODISS to be cited in the solicitation and if required, the specific issue of the individual documents referenced (see 2.1).
- c. Provisions for submission of first article sample.
- d. Test support hardware (see 6.11).
- e. Requirements for Ammunition Lot Number (see 4.4.1)
- f. Requirements for acceptance inspection equipment (AIE) designs (see 6.3).
- g. Certificate of Conformance requirement for each lot of material and each lot or shipment of product.
- h. Requirements for First Article (see 4.3)

6.3 Submission of contractor inspection equipment designs for approval. Submit copies of designs as required to:

Commander, US Army RDECOM-ARDEC  
ATTN: AMSRD-AAR-QEM-C  
Building 62, Picatinny Arsenal, NJ 07806-5000

This address will be specified on the Contract Data Requirements List, DD form 1423 in the contract.

6.4 Drawings. Drawings listed in Section 2 of this specification under the heading U.S. Army Armament, Research Development and Engineering Center (ARDEC) may also include drawings prepared by, and identified as ARRADCOM, Edgewood Arsenal, Frankford Arsenal, Rock Island Arsenal or Picatinny Arsenal drawings. Technical data originally prepared by these activities is now under the cognizance of ARDEC.

6.5 Submission of test data. One copy of proving ground ballistic acceptance test data (i.e., firing record) shall be forwarded to each of the following:

Commander, U.S. Army RDECOM-ARDEC  
ATTN: AMSRD-AAR-QEM-C  
AMSRD-AAR-AEM-M  
Picatinny Arsenal, NJ 07806-5000

6.6 Submission of alternative conformance provisions. All contractor proposed alternative conformance provisions will be submitted to the Government for evaluation/approval as directed by the contracting activity.

6.7 Sensitivity calculations. The mean drop velocity and standard deviation shall be calculated using an ARDEC developed software program. For a copy of the software contact

Commander, U.S. Army RDECOM-ARDEC  
ATTN: AMSRD-AAR-QEM-C  
Building 62 South, Picatinny Arsenal, NJ 07806-5000

6.8 Burst strength test fixture. Equipment designs for similar paper tubes are available for reference in MIL-C-48161, MIL-C-48155 and MIL-C-48396. For copies contact,

Commander, U.S. Army RDECOM-ARDEC  
ATTN: AMSRD-AAR-QEM-C  
Picatinny Arsenal, NJ 07806-5000

6.9 Definitions. The following definitions are provided:

6.9.1 Verification methods:

- a. Analysis - The use of analytical methods and mathematical formulas to determine if an item meets a requirement
- b. Demonstration - A functional test (for example, ballistic firing) that provides verification that a requirement is met

- c. Examination - Inspections utilizing gage(s) or visual means to assure conformance to requirement
- d. Test - The conduct of specific procedures and methods to provide data verifying a requirement is met

6.10 Critical Classification Rationale:

Paragraph	Critical Callout(s)	Critical Rationale
4.4.2.5	C II – 1 Flash hole missing or obstructed	Defect may create elevated pressure inside fin cavity causing rupturing of the fin. Defect may also prevent propulsion gases to evenly ignite surrounding propelling charges. May lead to short round.
4.4.2.7	C II - 1 Longitudinal flash hole missing or obstructed	Defect may create elevated pressure inside fin cavity causing rupturing of the fin. Defect may also prevent propulsion gases to evenly ignite surrounding propelling charges. May lead to short round.
4.4.2.7	C II – 2 Flash hole(s) missing or excessive in number or obstructed	Defect may create elevated pressure inside fin cavity causing rupturing of the fin. Defect may also prevent propulsion gases to evenly ignite surrounding propelling charges. May lead to short round.
4.4.2.8	C II – 1 Heat Shrinkable tubing missing, loose, or does not completely cover the flash holes	Erratic/uneven ignition of M9 Flake will lead to improper burning of propelling charge, which could cause potential short round.
4.4.2.11	C I -1 Sensitivity non-functioning	This test is conducted to ensure that the primer is not too sensitive. A defect may lead primer initiation during cartridge handling likely resulting in death or serious injury to the soldier.
4.4.2.11	C I -2 Safety Drop Test	To ensure the safety requirements are met. If a round is dropped the propellant shall not be initiated. If it is, a serious injury to the user may result.
4.4.2.11	C II -1 Firing plug not loose after assembly	To ensure that the ignition train is properly executed to ignite the propellant in the ignition cartridge. A defect may lead to a misfire.
4.4.2.11	C II -2 Firing plug above flush with head surface	If a round is dropped the Ignition Cartridge/Propellant may be initiated. If it is serious injury to the user may result.
4.4.2.12	C I -1 Flash tube assembly missing	To ensure that the ignition train is properly executed to ignite the propellant charges. A defect may lead to a misfire.

4.4.2.12	C II -1 Propellant weight greater than 10 grains below lower limit or above upper limit (after loading)	This is classified as critical because the low amount of propellant could produce a short round. High amount of propellant could produce high pressure build up in the tube resulting in possible rupture of gun barrel expelling shrapnel and blast effects to the gun area/location causing a serious injury to the user.
4.4.2.13	C I -1 Propellant weight greater than 10 grains below lower limit or above upper limit	This is classified as critical because the low amount of propellant could produce a short round. High amount of propellant could produce high pressure build up in the tube resulting in possible rupture of gun barrel expelling shrapnel and blast effects to the gun area/location

6.11 Test support hardware. The following test hardware quantity is required to conduct the safety drop test and ballistic test for each of the First Article and Lot Acceptance Testing.

<u>Hardware</u>	<u>Safety Drop</u>	<u>Static Pressure</u>	<u>Ballistic</u>
Inert M734/M734A1 fuze	25	-	50
Inert loaded M821A1/A2 body assembly	12	-	50
M24 fin	25	25	50

6.12 Ammunition lot numbers and data cards. Ammunition lot numbers and Ammunition Data Cards shall be in accordance with MIL-STD-1168.

6.13 Subject term (key word) listing.

Functioning test  
Leak test  
Sensitivity  
Velocity